

**WHEEL MECHANISM FOR SKI-EQUIPPED VEHICLES**

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to the general art of  
5 land vehicles, and to the particular field of land vehicles  
which include one or more ski-like runners.

2. Discussion of the Related Art

The sport of riding snowmobiles has become very popular  
in many areas. Obviously, riding a snowmobile is most  
10 popular where there are deep packs of snow and/or ice.  
Generally, a snowmobile has a continuously rotating drive  
track in the rear that contacts the snow and/or ice and ski-  
type runner elements in the front that ride on the snow  
and/or ice.

15 While this construction is quite efficient for snow  
and/or ice surfaces, many snowmobiles encounter terrain that  
is covered by snow and/or ice and is also free of such  
covering. In such situations, many snowmobiles are not  
efficient and, in some cases, cannot be operated at all due  
20 to the lack of proper ground covering.

Therefore, there is a need for a mechanism that can be

used to permit a snowmobile to operate on snow- or ice-covered surfaces and also on snow-free surfaces.

Since a person operating a snowmobile does not wish to stop operation of the vehicle to change the configuration of the vehicle, any system on such a vehicle that is intended to accommodate both snow and/or ice covered surfaces as well as surfaces that are not covered with snow or ice should be easy and quick to change or such a system may not be commercially viable.

Therefore, there is a need for a mechanism that can be used to permit a snowmobile to operate on snow- or ice-covered surfaces and also on snow-free surfaces and which can be quickly and easily deployed.

Any system that can be changed from one configuration to another should be secure in either configuration. That is, if the system is in the snow/ice-engaging mode, it should be very secure in that configuration, and if the system is in the road-engaging mode, it should also be very securely maintained in that mode as well.

Therefore, there is a need for a mechanism that can be used to permit a snowmobile to operate on snow- or ice-covered surfaces and also on snow-free surfaces and which can be quickly and easily deployed and which is securely stored when not in use.

Since snowmobiling is such a popular passtime, many people already own a snowmobile. To be most commercially successful, any mechanism or accessory for such vehicles should be adaptable for use on either new or existing  
5 vehicles. If the mechanism or accessory is to be used on an existing vehicle, it should be very easy to be retrofit onto the existing vehicle or owners of such vehicles will not accept the accessory.

Therefore, there is a need for a mechanism that can be  
10 used to permit a snowmobile to operate on snow- or ice-covered surfaces and also on snow-free surfaces and which can be easily and quickly retrofit on an existing snowmobile.

Any accessory for a vehicle such as a snowmobile should  
15 obtain more commercial success if that accessory enhances already-existing features of the vehicle. Thus, any snowmobile accessory that is intended to enable the vehicle to operate on snow- or ice-free surfaces will be more acceptable if that same feature can be used to enhance the  
20 operation of the vehicle on snow or ice as well, if desired.

Therefore, there is a need for a mechanism that can be used to permit a snowmobile to operate on snow- or ice-covered surfaces and also on snow-free surfaces and can be used to enhance the steering capability of a snowmobile on

snow.

#### PRINCIPAL OBJECTS OF THE INVENTION

It is a main object of the present invention to provide a mechanism that can be used to permit a snowmobile to  
5 operate on both snow- or ice-covered surfaces and snow-free surfaces.

It is another object of the present invention to provide a mechanism that can be used to permit a snowmobile to operate on snow- or ice-covered surfaces and on snow-free  
10 surfaces and which can be quickly and easily deployed.

It is another object of the present invention to provide a mechanism that can be used to permit a snowmobile to operate on snow- or ice-covered surfaces and on snow-free surfaces and which can be quickly and easily deployed and  
15 which is securely stored when not in use.

It is another object of the present invention to provide a mechanism that can be used to permit a snowmobile to operate on snow- or ice-covered surfaces and on snow-free surfaces and which can be easily and quickly retrofit on an  
20 existing snowmobile.

It is another object of the present invention to provide a mechanism that can be used to permit a snowmobile to operate on snow- or ice-covered surfaces and on snow-free

surfaces and can be used to enhance the steering capability of a snowmobile on snow.

#### SUMMARY OF THE INVENTION

These, and other, objects are achieved by a wheel  
5 mechanism for use on ski-equipped vehicles such as  
snowmobiles which comprises a strut which is pivotally  
attached to the vehicle and a telescoping piston unit which  
is also pivotally attached to the vehicle adjacent to the  
strut. A wheel is attached to the strut. When the  
10 telescoping piston is extended, the strut pivots and the  
wheel is moved outwardly and downwardly with respect to the  
front of the vehicle. The wheel is lifted when the piston is  
retracted. The wheel can thus be moved between a stored  
position away from the surface on which the vehicle is  
15 riding and a deployed or use position engaging the surface  
on which the vehicle is riding. In the use position, the  
wheel can lift the front of the vehicle off of the surface  
far enough to lift ski runner elements on the front of the  
vehicle off the surface. Thus, the vehicle will be supported  
20 by its drive mechanism in the rear of the vehicle and the  
wheel when the wheel mechanism embodying the present  
invention is in the deployed position and is supported on  
the drive mechanism in the rear of the vehicle and the ski

runner elements on the front of the vehicle when the mechanism embodying the present invention is in the stored position. However, the wheel can also be deployed only so far as to contact the ground and not elevate the runner  
5 elements whereby the wheel can be used for additional steering control.

Using the mechanism embodying the present invention will permit a snowmobile to be operated on both snow- or ice-covered surfaces and snow-free surfaces. The mechanism  
10 is securely stored but is quickly and easily deployed so a user can adapt his or her vehicle to the particular terrain on which the vehicle is being operated. The wheel included in the mechanism can be changed to meet the requirements of the terrain. For example, one wheel can be used for road  
15 surfaces, while another wheel can be used on dirt surfaces and yet another wheel can be used on ice, and so on. The ability to be quickly deployed permits the mechanism embodying the present invention to be used in conjunction with the ski runner elements on the front of a snowmobile so  
20 improved and enhanced steering can be realized. The mechanism embodying the present invention is easily retrofit onto an existing vehicle so the owner of an existing snowmobile need not incur great expense or go to great lengths to realize the benefits of the mechanism embodying

the present invention.

#### BRIEF DESCRIPTION OF THE DRAWING FIGURES

Figure 1 is a perspective view of a mechanism embodying the present invention which is used to lift the ski runner  
5 elements on the front of a snowmobile off the surface.

Figure 2 is a perspective view of a snowmobile which includes the mechanism embodying the present invention.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Other objects, features and advantages of the invention  
10 will become apparent from a consideration of the following detailed description and the accompanying drawings.

Referring to the Figures, it can be understood that the present invention is embodied in a wheel mechanism 10 for use on ski-equipped vehicles such as a snowmobile S.

15 Mechanism 10 comprises a first pivot unit 12 which is adapted to be fixedly secured to a snowmobile having a front end SF and a rear end SR with a drive mechanism SD located in the rear end of the snowmobile and ground-engaging ski runner elements SE on the front end of the snowmobile. The  
20 drive mechanism of the snowmobile can be a track mechanism or the like as will be known to those skilled in the art. The exact drive mechanism associated with the snowmobile is

not part of the invention and thus will not be further described. The first pivot unit is located near the front end of the snowmobile as can be understood from Figure 2.

A steering yoke 14 is adapted to be operatively  
5 connected to a steering system SS of the snowmobile with the operative connection being understood by those skilled in the art based on the teaching of this disclosure.

A strut 16 has a proximal end 18 pivotally secured to first pivot unit 12 and is operatively connected to steering  
10 yoke 14. Strut 16 has a distal end 20.

A connection element 22 is mounted on the strut 16 near the distal end 20 of the strut 16.

A second pivot unit 24 is adapted to be fixedly secured to the snowmobile adjacent to the first pivot unit.

15 A hydraulic unit 26 includes a housing 30 which has a proximal end 32 connected to the second pivot unit 24 and a distal end 34.

A hydraulic ram 40 is telescopingly accommodated in the housing 30 of the hydraulic unit 26 to move into and out of  
20 the hydraulic housing 30 as indicated by arrow 42 in Figure 1. The hydraulic ram 40 has a distal end 44.

A third pivot connection 46 is also connected to the strut 16. The distal end 44 of the hydraulic ram 40 of the hydraulic unit 26 is pivotally connected to third pivot



connection 46.

A source of hydraulic fluid F is fluidically connected to the housing 30 of the hydraulic unit 26 and is operatively connected to a control system C on the snowmobile in a manner known to those skilled in the art based on the teaching of this disclosure.

A ground-engaging wheel 60 is fixedly mounted on the strut 16 at the distal end 20 of the strut 16. Wheel 60 can be any wheel which is suitable for the terrain that will be encountered by the snowmobile.

A shield 70 has a proximal end 72 pivotally mounted on the snowmobile adjacent to the first pivot unit 12 and a distal end 74 connected to the distal end 20 of the strut 16.

Strut 16 and hydraulic unit 26 and shield 70 and ground-engaging wheel 60 are all movable between a stored orientation indicated in Figure 2 in dotted lines, with the ground-engaging wheel 60 located adjacent to the snowmobile and a use orientation, indicated in solid lines in Figure 2, with the ground-engaging wheel 60 spaced apart from the snowmobile. Movement of these elements from a stored orientation toward a use orientation is indicated in Figure 1 by arrows 42 and 80. The reverse movement will be understood by those skilled in the art based on the teaching

of the present disclosure. The ground-engaging wheel 60 supports the front end of the snowmobile and elevates the ground-engaging runner elements off of the ground when the ground-engaging wheel 60 is in the use orientation whereby  
5 the snowmobile is supported by the ground-engaging wheel 60 and the drive mechanism of the snowmobile when the ground-engaging wheel 60 is in the use orientation and the snowmobile is supported by the drive mechanism and the ground-engaging runner elements when the ground-engaging  
10 wheel 60 is in the stored orientation.

Use of the mechanism 10 will be understood from the foregoing, and thus will only be briefly discussed. If one wishes to operate the vehicle on snow or ice, mechanism 10 is maintained in the stored orientation with the ground-  
15 engaging wheel 60 spaced apart from the ground and the ground-engaging runner elements are used in conjunction with the drive mechanism of the vehicle to propel the vehicle in the manner usual to snowmobiles. However, if the vehicle is to be operated on a dry road or other such dry surface, the  
20 operator activates mechanism 10 using the control system on the vehicle to lower the ground-engaging wheel 60 in directions 42 and 80 away from the stored orientation and into a use orientation with the ground-engaging wheel 60 in contact with the ground over which the vehicle will

traverse. Wheel 60 is lowered until the vehicle is supported by the wheel 60 in place of the runner elements and the runner elements are elevated off the supporting surface. The vehicle is then propelled by the drive mechanism and is supported by the drive mechanism and wheel 60. Wheel 60 can also be lowered so that it merely engages the supporting surface and does not elevate the runner elements off of the surface if additional steering control is desired when the vehicle is still on ice or snow and the runner elements are still being used to support the vehicle. Wheel 60 can be a snow tire, a tire that is equipped for ice or the like as is suitable and desired by the operator of the vehicle.

It is understood that while certain forms of the present invention have been illustrated and described herein, it is not to be limited to the specific forms or arrangements of parts described and shown.